

Claims:

1. A metal or metal oxide porous material having a rod-shaped crystal.
2. A metal or metal oxide porous material, which is a soft or hard sponge material, dependant on preparation conditions.
3. The metal or metal oxide porous material according to claim 1 or 2, which has communicating pores.
4. The metal or metal oxide porous material according to anyone of claims 1 to 3, wherein a cross-section of the rod-shaped crystal, taken in a direction perpendicular to the length direction, has a maximum external dimension of between 1 μ m to 50 μ m depending on preparation conditions.
5. The metal porous material according to anyone of claims 1 to 4, wherein the metal is selected from a group of noble metals or transition metals.
6. The metal porous material according to claim 5, wherein the noble metal is silver or gold.
7. The metal porous material according to anyone of claims 1 to 4, wherein the metal is composed with plural kind of metal element.
8. The metal oxide porous material according to anyone of claims 1 to 4, wherein the metal oxide is selected from a group of transition metal oxides.
9. The meal oxide porous material according to claim 8, wherein the transition metal oxide is iron oxide.

10. The metal oxide porous material according to anyone of claims 1 to 4, wherein the metal oxide is composed with plural kind of metal oxides.
11. The metal or metal oxide porous material according to anyone of claims 1 to 10, which has surface decorated with particles of metal or metal oxide selected from other kind of metal element or metal oxide.
12. A preparation method of a metal or metal oxide porous material according to anyone of claims 1 to 7, wherein an aqueous viscous solution of metal or metal oxide salt material and dextran or a highly water soluble carbohydrate polymer, undergoes self-solidification, and is then baked.
13. A preparation method of metal porous material according to claim 11, wherein an aqueous viscous solution of other kind of metal salt material, metal or metal oxide colloidal particles in addition to metal salt material or metal oxide colloidal particles and dextran or a highly water-soluble carbohydrate polymer, undergoes self-solidification, and is then baked.
14. A preparation method of metal oxide porous material according to anyone of claims 1 to 4 and 8 to 10, wherein an aqueous viscous solution of colloidal metal oxide particles and dextran or highly water soluble carbohydrate polymer of glucose, undergoes self-solidification and is then baked.

15. The preparation method of metal or metal oxide porous material according to anyone of claims 12 to 14, wherein baking process is carried out at a temperature of not less than 500°C.
16. The preparation method of a metal or metal oxide porous material according to claim 15, wherein the baking process is carried out at a temperature in a range from not less than 500°C up to 900°C.
17. The preparation method of metal or metal oxide porous material according to anyone of claims 12 to 16, wherein the carbohydrate polymer is a polysaccharide.
18. The preparation method of a metal or metal oxide porous material according to anyone of claims 12 to 17, wherein dextran or a carbohydrate polymer in the aqueous viscous solution has a concentration in the range of 10 to 10% by weight and metal salt material or colloidal particles of metal oxide has a concentration in the range of 10 to 90% by weight.
19. The preparation method of metal or metal oxide porous material according to claim 18, wherein metal salt material has a concentration in the range of 15 to 60% by weight.
20. The preparation method of porous material according to anyone of claims 12 to 19, wherein dextran or a carbohydrate polymer in the aqueous viscous solution has a molecular weight in the range of 10,000 to 500,000.

21. A metal or metal oxide catalyst which contains the metal or metal oxide porous material according to any one of claims 1 to 11 as at least one kind of effective active component.
22. A silver catalyst according to claim 21.
23. The preparation method according to anyone of claims 12 to 20, which can be applied to prepare metal or metal oxide sponges or metal or metal oxide open framework architectures by use of preformed nanoparticles or micro particles in addition to, or instead of metal salt material or colloidal particles of metal oxide.